

Claims

1. Vehicle, of the industrial truck type, for handling loads comprising

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- a chassis (3),
- at least three wheels (4, 4') arranged to support a chassis while resting on the ground, and
- a lifting unit (8) connected to the chassis having one or more members (9) arranged to carry loads and a power arrangement to raise and lower the load-carrying members, relative to the chassis,

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characterized in that, each of the wheels is rotatably arranged relative to the chassis partly around a first, substantially vertical axis, partly around a second axis, and that at least two of the wheels are of a first wheel type that is rotatably arranged relative to the chassis around a said second axis that constitutes an angle greater than 0° but less than 90° relative to the first axis, whereby each said wheel of the first type has a contact surface against the ground which defines a so-called rolling point against it, which is laterally displaced in the horizontal plane relative to the first axis, and that the vehicle also comprises:

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- means (17) to individually control the alignment of said wheels around the chassis by turning around the first axis,
- means (20) to individually drive both of the said wheels of the first type,
- a control device (16) to control the power arrangement and drive means to move the parts movable relative to the chassis of the vehicle to bring about not only displacements of the vehicle, but also movement of the parts of the lifting unit which are moveable with respect to the chassis.

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- 35 2. Vehicle according to claim 1, characterized in that, it even comprises a regulation device (18) to order movement of the vehicle in a horizontal plane, the regulation device is designed

with the capability, on request of a change in the direction of the vehicle in the horizontal plane, to order a position for the turning point for the vehicle located anywhere in the horizontal plane, and that the control device (16) is designed to provide
5 instantaneous desired values for each said first wheel's angular alignment relative to the longitudinal axis of the vehicle on the basis of orders concerning said position from the regulation device and to send signals to the control means (17) to achieve this alignment.

10 3. Vehicle according to claim 2, **characterized** in that, the control device (16) is arranged to control said wheels (4, 4') via the control means (17) according to the basic principle that they should be mutually parallel aligned during movements of the
15 vehicle in the horizontal plane with the exception of on an ordered change of the vehicle's alignment in the horizontal plane ordered by the regulation device (18).

20 4. Vehicle according to claim 2 or 3, **characterized** in that, the control device (16) is designed to assume a parallel alignment of said wheels (4, 4') about the first axis on providing desired values for each wheel's alignment in the horizontal plane for a determined position of said turning point to determine each wheel's turning about said first axis relative to said parallel
25 alignment.

5. Vehicle according to any of the preceding claims, **characterized** in that, the lifting unit (8) is carried by the chassis via a mast-like beam (12), that is pivotably connected to the
30 chassis (3) about a first substantially horizontal axis (26), and that the power arrangement comprises first power means (27) arranged to pivot the beam around this axis relative to the chassis.

35 6. Vehicle, of the industrial truck type, for handling loads comprising
• a chassis (3),

- at least three wheels (4, 4') arranged to support the chassis while resting on the ground, and
- a lifting unit (8) connected to the chassis having one or more members (9) arranged to carry loads and a power arrangement to raise and lower the load-carrying members relative to the chassis,

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10 **characterized** in that, the lifting unit is carried by the chassis via a mast-like beam (12), that is pivotably connected to the chassis (3) about a first substantially horizontal axis (26), and that the power arrangement comprises first power means (27) arranged to pivot the beam around this axis relative to the chassis.

15 7. Vehicle according to any of the preceding claims, **characterized** in that, the lifting unit is carried by the chassis via a mast-like beam (12), and the beam is connected to the chassis in the vicinity of one longitudinal side (13) of the vehicle as seen in its normal driving direction.

20 8. Vehicle according to any of the preceding claims, **characterized** in that, the lifting unit is carried by the chassis via a mast-like beam (12), and that the beam comprises several elongated beam members (28) that are displaceable relative to each other in the longitudinal direction of the beam, and that the
25 power arrangement comprises second power means (29) arranged to displace said beam members relative to each other to change the length of the beam.

30 9. Vehicle according to claim 8, **characterized** in that, the beam members (28) are telescopically received in each other and displaceable relative to each another.

35 10. Vehicle according to any of the preceding claims, **characterized** in that, the lifting unit (8) is carried by the chassis via a mast-like beam (12), the load-carrying members (9) are arranged in the vicinity of the free end of the beam that is distant from the chassis, the load-carrying members are pivotably

connected to the beam about a substantially horizontal second axis (30), and the power arrangement comprises a third power means (31) arranged to cause pivoting of the load-carrying members or a part carrying these about said second horizontal axis.

11. Vehicle according to claim 5, 8 and 10 or 6, 8 and 10, characterized in that, the control device (16) is arranged to co-ordinate the control of the first, second and third power means (27, 29, 31) to achieve the desired movement pattern in a vertical plane of the load-carrying members (9) height-wise, length-wise, and in the rotating direction.

12. Vehicle according to claim 11, characterized in that, the control device (16) is arranged to carry out said co-ordination so that the load-carrying members (9) maintain a constant angle, preferably 0°, relative to a horizontal plane during said displacement movement and/or pivoting movements of the beam (12).

13. Vehicle according to claim 5 and 7 or 6 and 7, characterized in that, the beam (12) is arranged at a rear end (14) of the vehicle in the vehicle's normal driving direction with its connection to the chassis via its first horizontal axis for pivoting relative to the chassis.

14. Vehicle according to claim 7, characterized in that, it comprises a device (15) for attaching the lifting unit's load-carrying members (9) in the vicinity of the free end of the beam which is distant to the chassis, and that this device comprises a member (36) connected to said end of the beam (12) which is arranged to extend towards the vehicle's centre as seen in its normal driving direction to maintain an attaching point for the load-carrying members at the attaching device substantially centred relative to a horizontal longitudinal axis of the vehicle extending in said normal driving direction through the vehicles centre of gravity.

15. Vehicle according to any of the preceding claims,
characterized in that, the lifting unit's load-carrying members (9)
are replaceably attachable on a beam, or such, with a device
5 (15) for attaching tools or instruments at its end.

16. Vehicle according to any of the preceding claims,
characterized in that, the lifting unit (8) has at least two load-
carrying members in the form of forks (9).
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17. Vehicle according to claim 16, **characterized** in that, the
forks (9) are arranged laterally displaceably on a frame (10) with
respect to the vehicle's normal driving direction, and that the
vehicle comprises power means (11) arranged to give rise to
15 displacement of the forks along the frame.

18. Vehicle according to claim 17, **characterized** in that, said
power means (11) for displacement of the forks (9) are arranged
to displace them in opposite directions to regulate the distance
20 between the forks.

19. Vehicle according to claim 17, **characterized** in that said
power means (11) for displacement of the forks (9) are arranged
to displace them in the same direction for common displacement
25 of these laterally relative to the chassis.

20. Vehicle according to any of the preceding claims, where the
vehicle comprises a driver's seat (2), **characterized** in that, the
driver's seat is pivotably arranged relative to the chassis (3)
30 about a substantially vertical axis, and that the vehicle comprises
power means manoeuvrably arranged to pivot the driver's seat
around said vertical axis relative to the chassis for alignment of
the driver's seat relative to the chassis depending on the
prevailing operation of the vehicle and/or the desire of the driver.